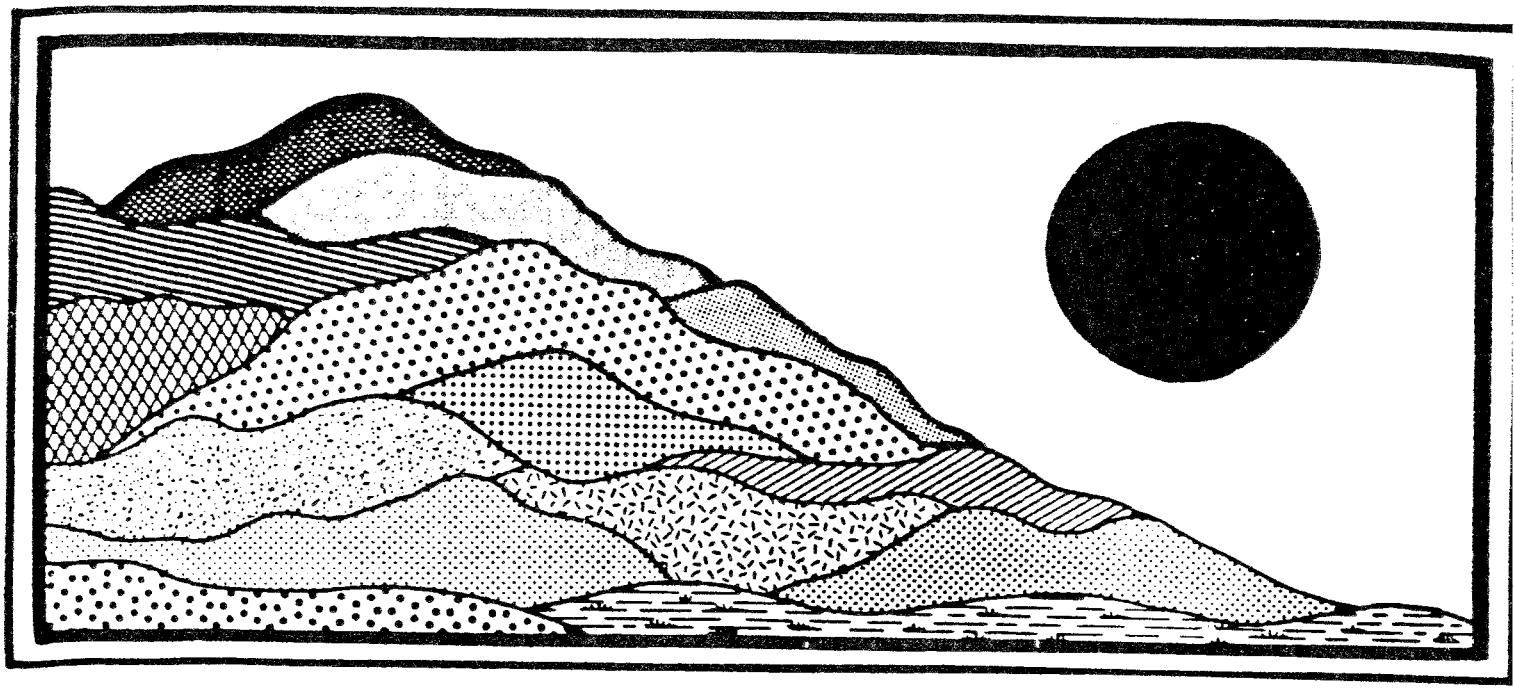
Hescock Subdivision

North Stonington, Connecticut

October 1985



ENVIRONMENTAL REVIEW TEAM REPORT

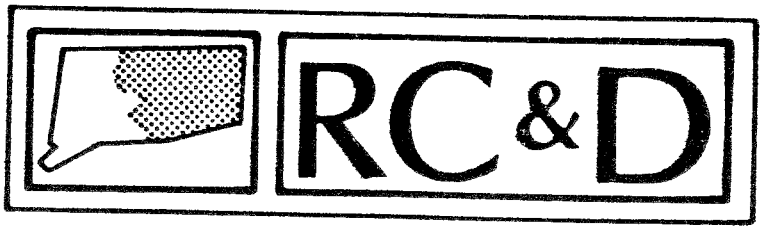
EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

Hescock Subdivision

North Stonington, Connecticut

Review Date: 9-12-85

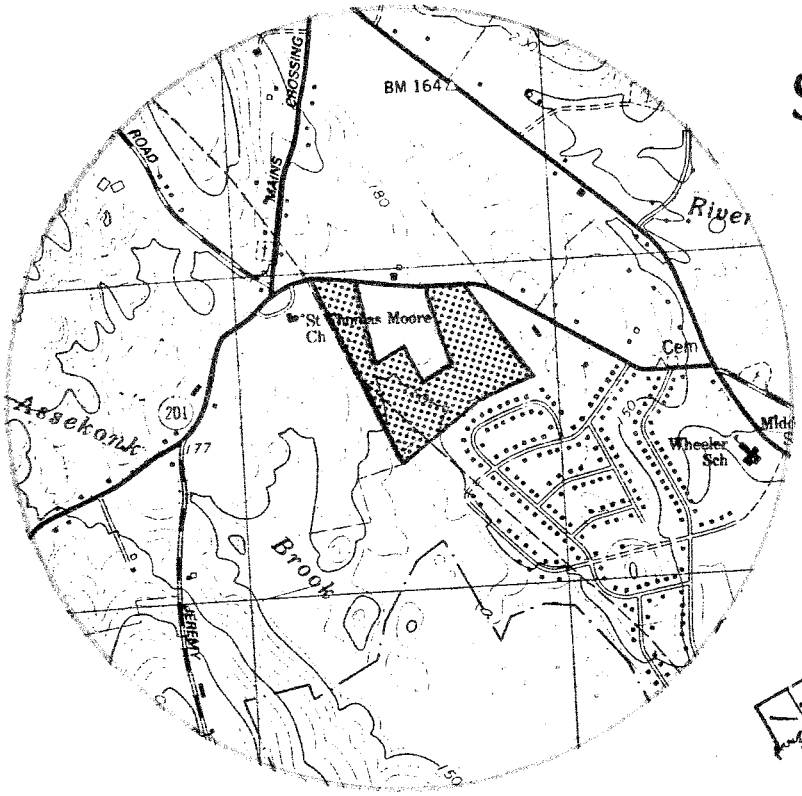
Report Date: 10-85

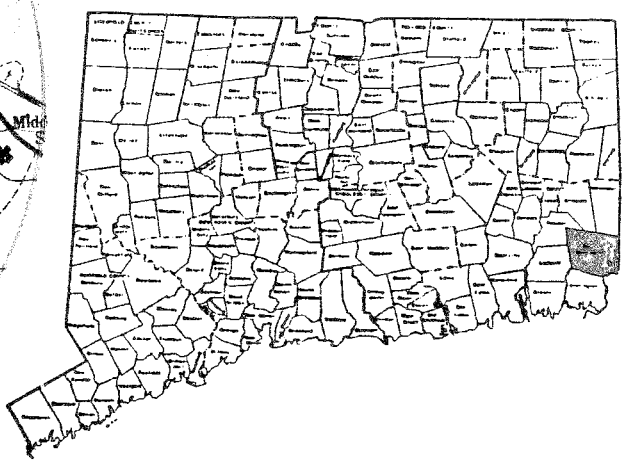


ENVIRONMENTAL REVIEW TEAM
PO BOX 198
BROOKLYN, CONNECTICUT 06234

Site Location

HESCOCK SUBDIVISION
NORTH STONINGTON





EASTERN CONNECTICUT

RESOURCE CONSERVATION

& DEVELOPMENT AREA

ENVIRONMENTAL REVIEW TEAM REPORT
ON
THE HESCOCK SUBDIVISION
NORTH STONINGTON, CONNECTICUT

This report is an outgrowth of a request from the North Stonington Conservation Commission to the New London Soil and Water Conservation District (S&WCD). The S&WCD referred this request to the Eastern Connecticut Resource Conservation and Development (RC&D) Area Executive Committee for their consideration and approval. The request was approved and the measure reviewed by the Eastern Connecticut Environmental Review Team (ERT).

The ERT met and field checked the site on Thursday, September 12, 1985. Team members participating on this review included:

Donald Capellaro	-	Sanitarian - CT Department of Health
Barry Cavanna	-	District Conservationist - U.S.D.A., Soil Conservation Service
Gerry Amt	-	Regional Planner - Southeast CT Regional Planning Agency
Elaine Sych	-	Environmental Review Team Coordinator - Eastern CT RC&D Area
Bill Warzecha	-	Geologist - DEP, Natural Resources Center
Janet Wilscam	-	Sr. Environmentalist Analyst - DEP, Water Resources Unit

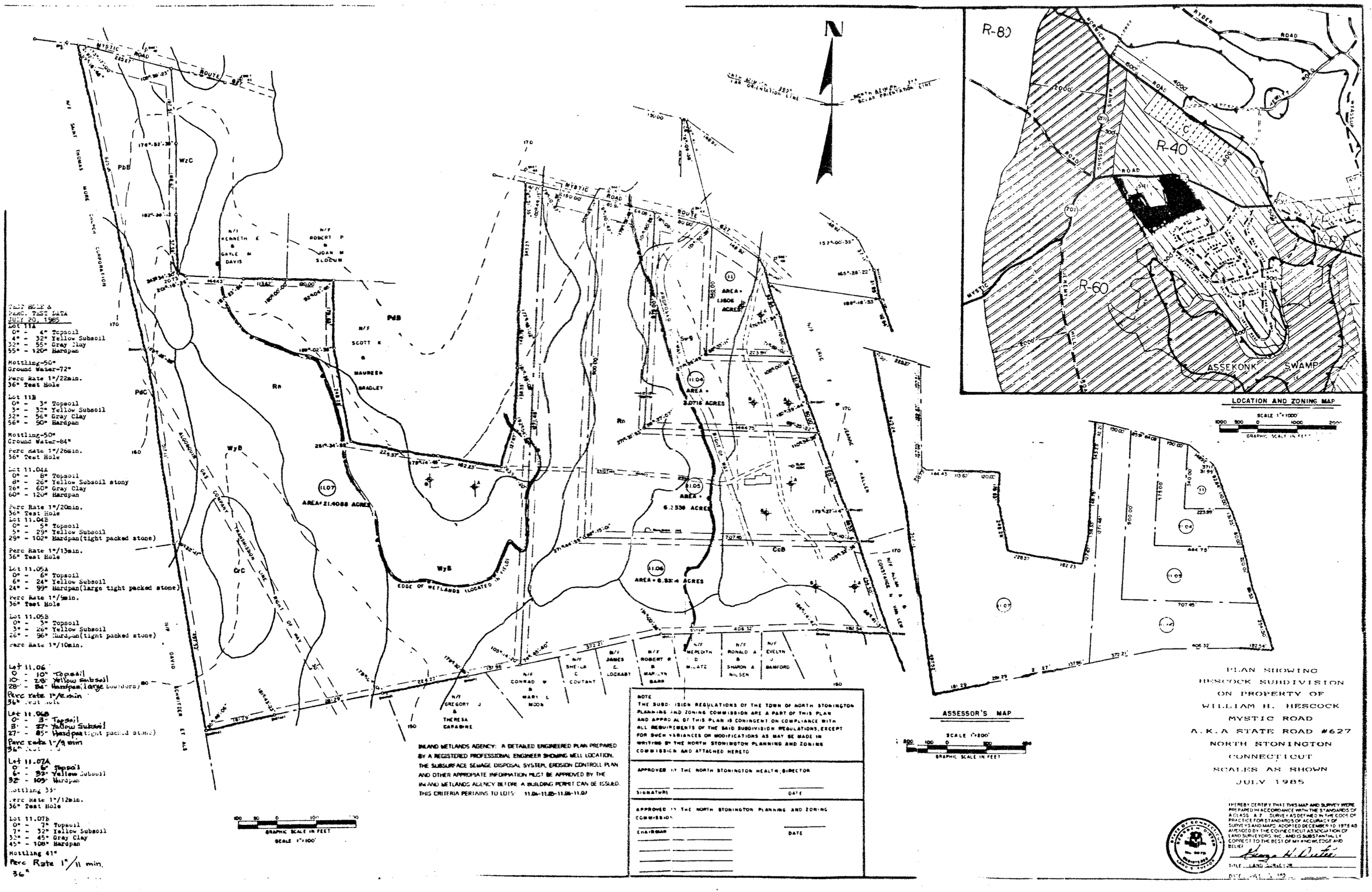
Prior to the review day, each Team member received a summary of the proposed project, a list of the Town's concerns, a soils map, a large scale topographic map, and a reduced site plan. The Team met with, and were accompanied by members of the Commission, the applicant and the surveyor for the applicant. Following the review, reports from each team member were submitted to the ERT Coordinator for compilation and editing into this final report.

This report represents the Team's findings. It is not meant to compete with private consultants by providing site designs or detailed solutions to development problems. The Team does not recommend what final action should be taken on a proposed project--all final decisions and conaclusions rest with the Town and landowner. This report identifies the existing resource base and evaluates its significance to the proposed development, and also suggests considerations that should be of concern to the developer and the Town. The results of this Team action are oriented toward the development of better environmental quality and the long-term economics of land use.

The Eastern Connecticut RC&D Project Committee hopes that you will find this report of value and assistance in making your decisions on this subdivision.

If you require any additional information, please contact:

Elaine A. Sych
ERT Coordinator
Eastern Connecticut RC&D Area
P.O. Box 198
Brooklyn, CT 06234
(203) 774-1253



TEST HOLE & PERC. TEST DATA
JULY 20, 1985

Lot 11A
0" - 4" Topsoil
4" - 32" Yellow Subsoil
32" - 55" Gray Clay
55" - 120" Hardpan

Mottling-50"
Ground Water-72"
Perc Rate 1"/22min.
36" Test Hole

Lot 11B
0" - 3" Topsoil
3" - 32" Yellow Subsoil
32" - 56" Gray Clay
56" - 90" Hardpan

Mottling-50"
Ground Water-84"
Perc Rate 1"/26min.
36" Test Hole

Lot 11.04A
0" - 8" Topsoil
8" - 26" Yellow Subsoil stony
26" - 60" Gray Clay
60" - 120" Hardpan

Perc Rate 1"/20min.
36" Test Hole

Lot 11.04B
0" - 5" Topsoil
5" - 29" Yellow Subsoil
29" - 102" Hardpan(tight packed stone)

Perc Rate 1"/13min.
36" Test Hole

Lot 11.05A
0" - 6" Topsoil
6" - 24" Yellow Subsoil
24" - 99" Hardpan(large tight packed stone)

Perc Rate 1"/5min.
36" Test Hole

Lot 11.05B
0" - 3" Topsoil
3" - 26" Yellow Subsoil
26" - 96" Hardpan(tight packed stone)

Perc Rate 1"/10min.

Lot 11.06
0" - 10" Topsoil
10" - 28" Yellow Subsoil
28" - 84" Hardpan(large boulders)

Perc Rate 1"/6min.
36" Test Hole

Lot 11.06B
0" - 3" Topsoil
3" - 27" Yellow Subsoil
27" - 85" Hardpan(tight packed stone)

Perc Rate 1"/9 min
36" Test Hole

Lot 11.07A
0" - 6" Topsoil
6" - 32" Yellow Subsoil
32" - 109" Hardpan

Mottling 35"
Perc Rate 1"/12min.
36" Test Hole

Lot 11.07B
0" - 7" Topsoil
7" - 32" Yellow Subsoil
32" - 45" Gray Clay
45" - 108" Hardpan

Mottling 41"
Perc Rate 1"/11 min.
36"

INLAND WETLANDS AGENCY: A DETAILED ENGINEERED PLAN PREPARED BY A REGISTERED PROFESSIONAL ENGINEER SHOWING WELL LOCATION, THE SUBSURFACE SEWAGE DISPOSAL SYSTEM, EROSION CONTROLL PLAN AND OTHER APPROPIATE INFORMATION MUST BE APPROVED BY THE INLAND WETLANDS AGENCY BEFORE A BUILDING PERMIT CAN BE ISSUED. THIS CRITERIA PERTAINS TO LOTS 11.04-11.05-11.06-11.07

NOTE
THE SUBDIVISION REGULATIONS OF THE TOWN OF NORTH STONINGTON PLANNING AND ZONING COMMISSION ARE A PART OF THIS PLAN AND APPROVAL OF THIS PLAN IS CONTINGENT ON COMPLIANCE WITH ALL REQUIREMENTS OF THE SAID SUBDIVISION REGULATIONS, EXCEPT FOR SUCH VARIANCES OR MODIFICATIONS AS MAY BE MADE IN WRITING BY THE NORTH STONINGTON PLANNING AND ZONING COMMISSION AND ATTACHED HERETO

APPROVED BY THE NORTH STONINGTON HEALTH DIRECTOR

SIGNATURE _____ DATE _____

APPROVED BY THE NORTH STONINGTON PLANNING AND ZONING COMMISSION

CHAIRMAN _____ DATE _____

PLAN SHOWING
HESCOCK SUBDIVISION
ON PROPERTY OF
WILLIAM H. HESCOCK
MYSTIC ROAD
A.K.A STATE ROAD #627
NORTH STONINGTON
CONNECTICUT
SCALES AS SHOWN
JULY 1985

I HEREBY CERTIFY THAT THIS MAP AND SURVEY WERE PREPARED IN ACCORDANCE WITH THE STANDARDS OF A CLASS A-2 SURVEY AS DEFINED IN THE CODE OF PRACTICE FOR STANDARDS OF ACCURACY OF SURVEYS AND MAPS, ADOPTED DECEMBER 10, 1975 AS AMENDED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. AND IS SUBSTANTIALLY CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF

George H. Dutton

TITLE LAND SURVEYOR

DATE JULY 1, 1985

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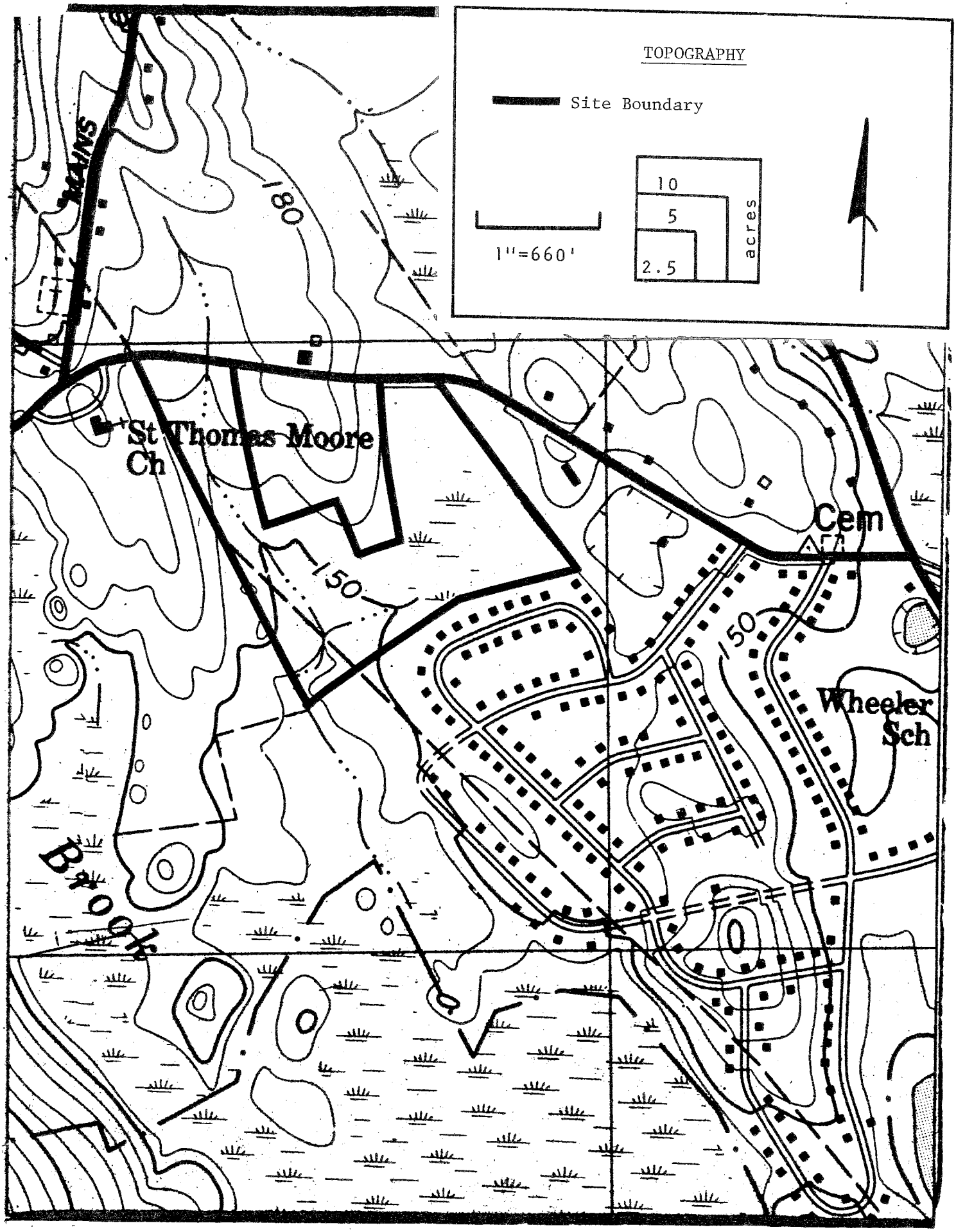
TABLE OF MAPS AND CHARTS


TOPOGRAPHY
Site Boundary
1"=660'
10
5
2.5
acres
MAIN
180
St Thomas Moore
Ch
150
Cem
150
Wheeler
Sch
Brook

I. INTRODUCTION

The proposed Hescock Subdivision is located on the south side of Mystic Road about 500 feet east of the intersection of Mystic Road and Route 201. It consists of an irregularly shaped parcel of land about 40.05 acres in size. The proposal consists of dividing the land into 5 lots ranging in size from 1.16 acres to 21.41 acres. The lots will be served by on-site wells and on-site septic systems. Access to the lots would be by a single private driveway.

The Team members had a number of areas of concern that are commented upon in this report. Recommendations and information dealing specifically with drainage, water supply, sewage disposal, wetlands, access, and land use suitability are to be found in the following sections. A brief summary of the major findings and recommendations may be found in Section X.

II. TOPOGRAPHY AND SETTING

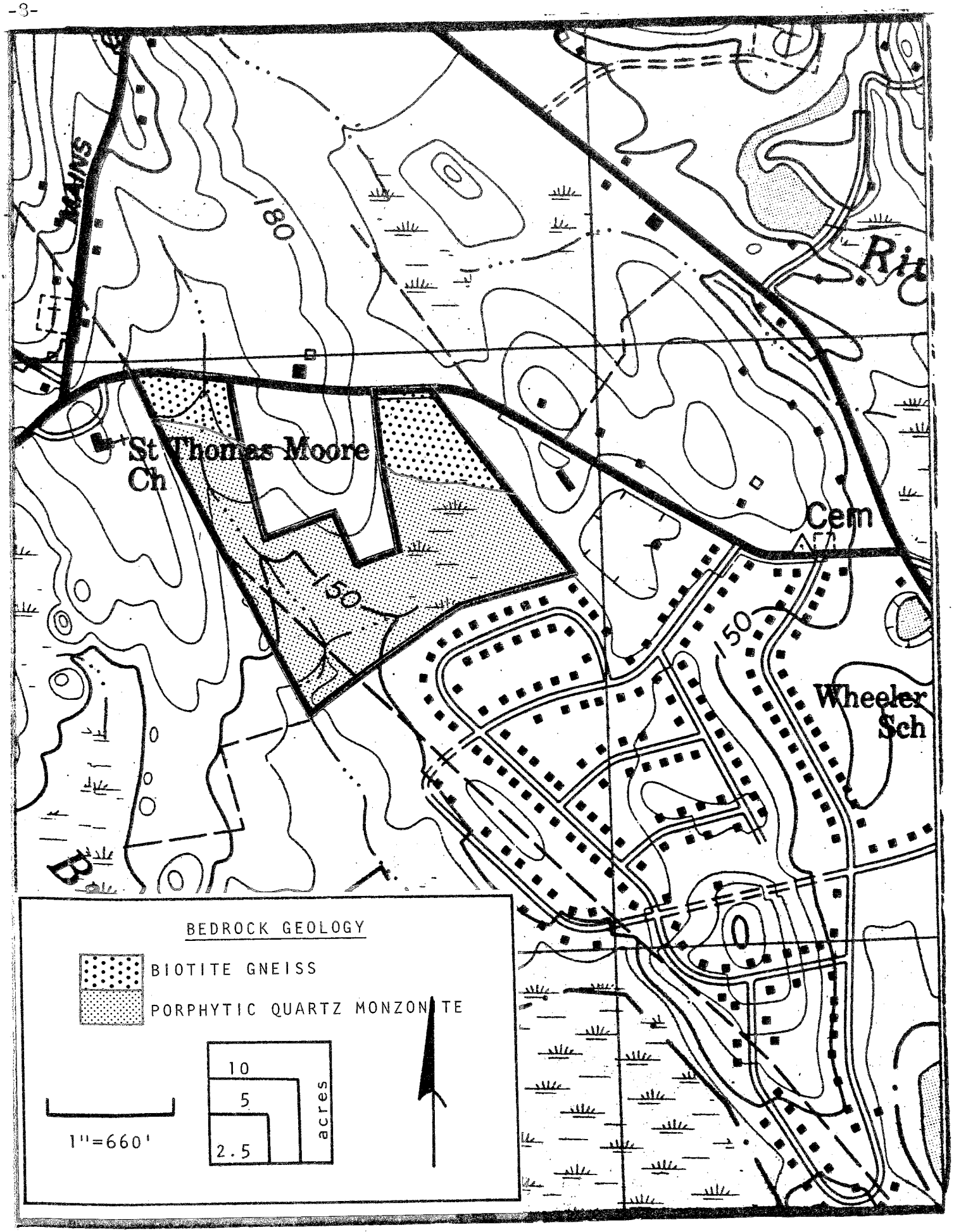
The topography is generally flat throughout the site. Elevations on the site range from a low of about 140 feet above mean sea levels at the southern portions of the property and rises gently to about ±175 feet at the northern limits (along Mystic Road).

Based on the topographic map distributed to Team members, at least two intermittent streamcourses traverse the site. Both streams ultimately flow into Assekonk Swamp to the south. There is also a woods roadway and the remains of an old charcoal manufacturing plant near the east side. A gas company transmission line right of way crosses the property near the southwest corner.

III. GEOLOGY

The proposed subdivision is located entirely within the Old Mystic topographic quadrangle. A bedrock geologic map (Map I-1424, by Richard Goldsmith) for the quadrangle has been published by the U.S. Geological Survey. The surficial geology for the quadrangle has not been published to date. However, there is preliminary information available for review at the Department of Environmental Protection's Natural Resources Center.

Based on visual observations made by the Team geologist on the review day, bedrock does not appear to break the ground surface on the site.


St Thomas Moore Ch
Cem
Wheeler Sch
180
150
150
BEDROCK GEOLOGY
BIOTITE GNEISS
PORPHYTIC QUARTZ MONZONITE
10
5
2.5
acres
1"=660'

According to deep test hole data supplied to Team members, bedrock was not encountered in any of the deep test pits excavated on the site. A total of ten deep test pits, which ranged between 7 feet and 10 feet below ground surface, were excavated in a scattered manner throughout the property.

Goldsmith classifies the two rock types underlying the site as a biotite gneiss and a porphyritic quartz monzonite. The rocks described as "biotite gneisses" underlie the northern parts of the property. These rocks consist of a distinctly to indistinctly layered light gray to gray, fine to medium grained gneiss, composed of the minerals biotite, quartz and plagioclase feldspar. The size of these mineral grains are generally equal throughout the rock. "Gneisses" are rocks in which platy or flaky minerals such as biotite alternate in thin layers with the more rounded minerals such as quartz and plagioclase feldspar. This mineral arrangement gives the rocks a distinct banded appearance.

The other rock type found on the site, a porphyritic quartz monzonite, underlies the southern parts. Goldsmith describes this rock as a gray to pinkish gray, medium to coarse grained porphyritic quartz monzonite and granodiorite composed of the minerals sodic oligoclase, flame and braid perthite, quartz, biotite and hornblende.

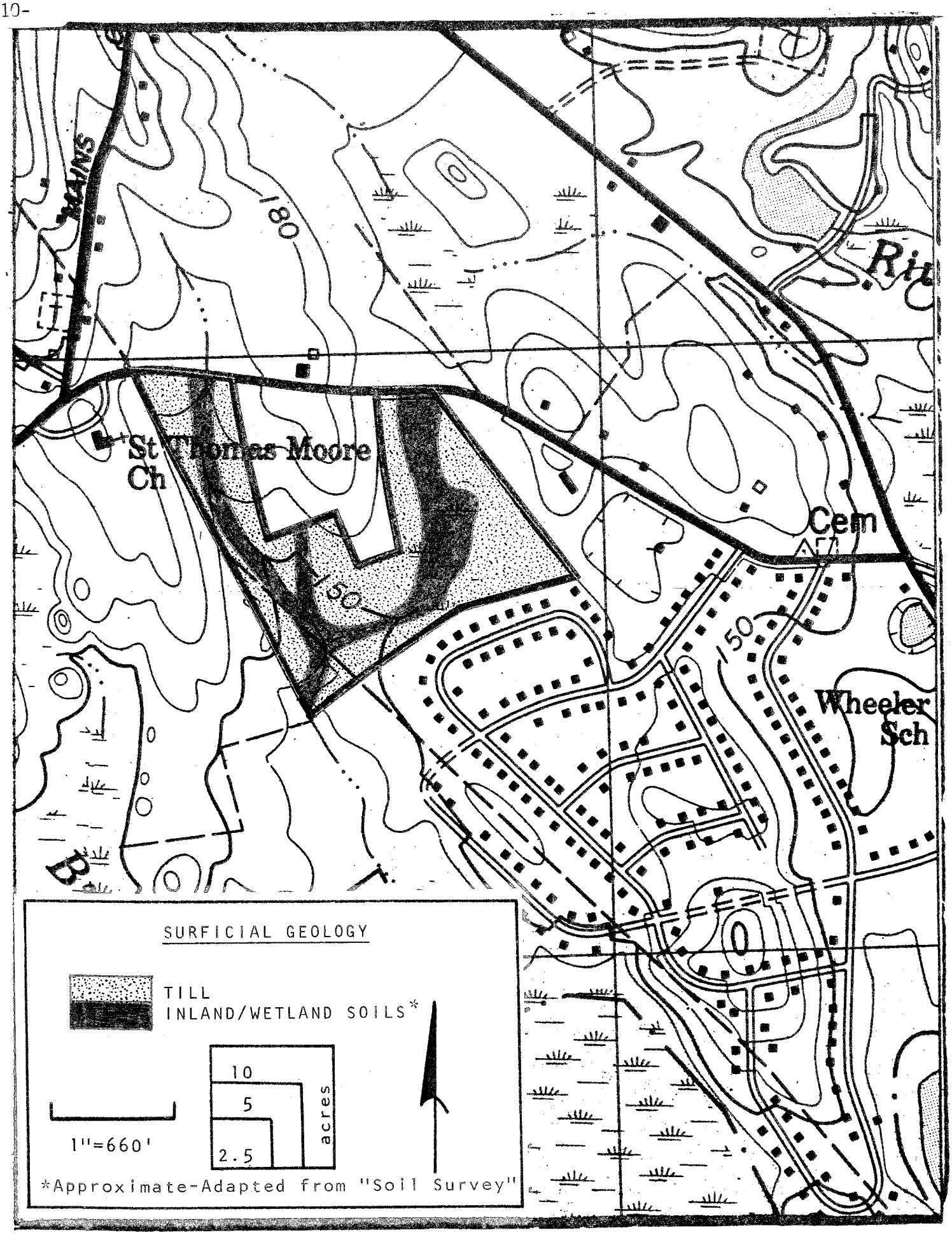
The term "quartz monzonite" refers to a plutonic rock which formed from molten material and which solidified below ground surface. Although the rock is composed mainly of feldspar minerals, about 12 to 25 percent of the rock contains the mineral quartz. The adjective "porphyritic" preceding the word quartz monzonite above is a textural term used to describe igneous rocks. Typically, a "porphyritic" rock is a rock whose texture is characterized by larger crystals which are set in finer groundmass that may be glossy or crystalline or both. As the percentage of plagioclase feldspar or dark-colored minerals such as iron, magnesium or calcium-rich minerals increases in a quartz monzonite, the rock grades into a granodiorite.

These rocks intruded the surrounding rock as a molten magma and solidified subsurfacely. Subsequent erosion has exposed the rocks in the Old Mystic quadrangle. They are younger in age (Permian geologic period about 255-205 million years old) than the surrounding metamorphic rocks (rocks geologically altered by great pressure and temperature).

The differences in the texture and/or mineralogy of these rocks should not have a direct impact on the potential of the site for a subdivision. It should be pointed out that the underlying bedrock may affect water quality and quantity of water withdrawn from any bedrock wells drilled on the site. (See Water Supply Section of this report)

Depth to bedrock is probably not much more than 10 feet throughout the site.

A blanket of glacial sediment known as till covers the bedrock on the site. The till, which consists of a non-sorted non-stratified mixture of rock particles of widely varying shapes and sizes, was deposited directly from glacier ice without substantial reworking by meltwater. Based on logs of deep test pits, the texture of the till on the site appears to be mostly


MAINS
180
St Thomas Moore
Ch
150
Cem
150
Wheeler
Sch
SURFICIAL GEOLOGY
TILL
INLAND/WETLAND SOILS*
10
5
2.5
acres
1"=660'
*Approximate-Adapted from "Soil Survey"

sandy with some silt and is relatively loose in the upper few feet. However, with depth (about 24" to 32"), the till tends to become more silty and more firm. This firmer layer probably impedes groundwater percolating downward through the soil resulting in a high water table during the wet times of the year. It should be noted that soil testing was conducted during the dry time of the year (July 20, 1985) and, therefore, deep test data is probably not representative of subsurface conditions during the wet time of the year.

Based on the "Soil Survey for New London County," seasonally wet areas on the site, which are comprised of regulated inland-wetland soils, generally parallel intermittent drainage channels.

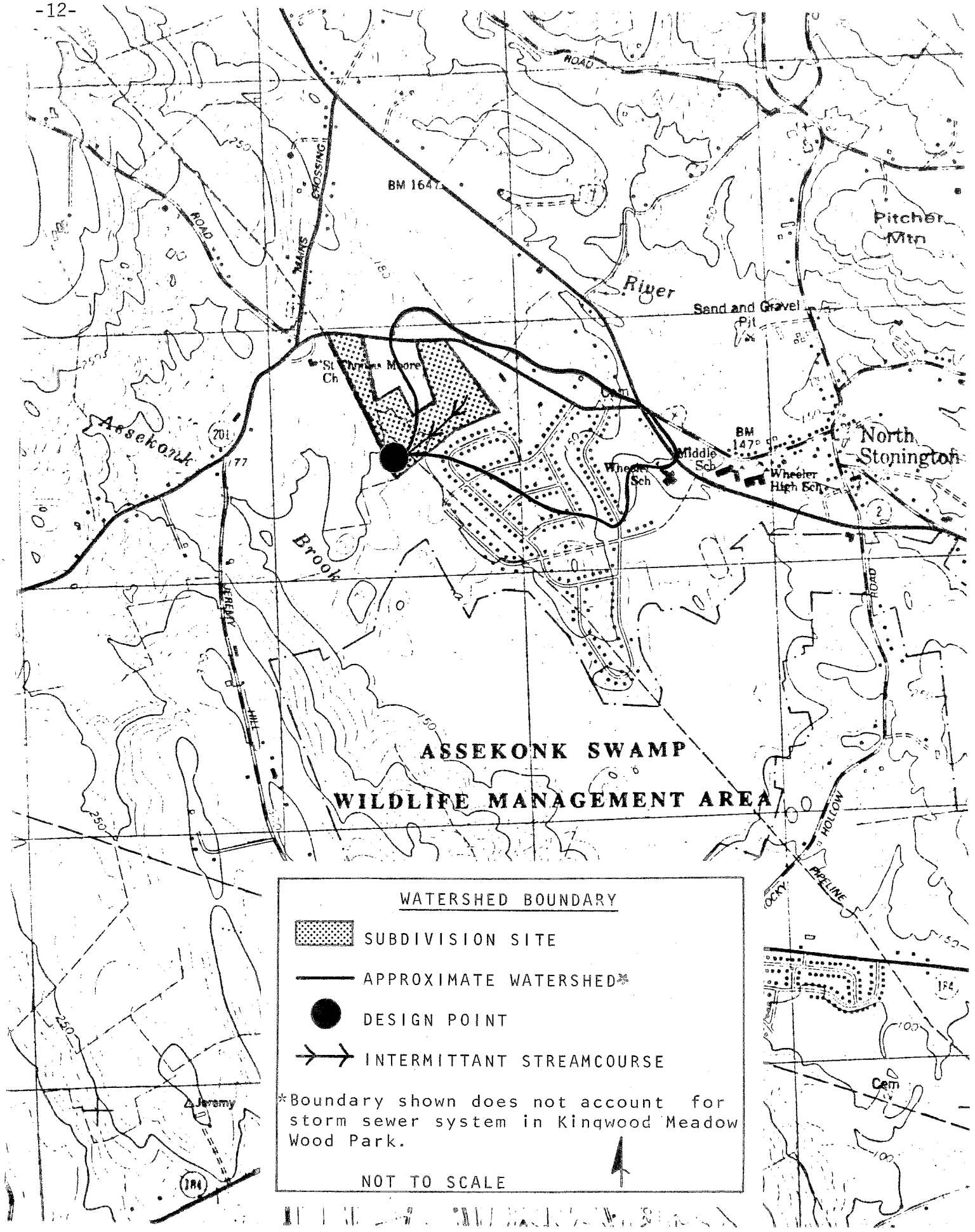
These soils are delineated by the symbol Rn (Ridgebury, Leicester, Whitman soils) on the accompanying soils map and comprise almost 40 percent of the soils on the site. Based on a visual inspection of the site, it appears that much of the site is wet and that the boundaries for inland-wetland soil may extend outside of the boundaries shown on the map. For this reason, it is recommended that a certified soil scientist map and flag the regulated inland-wetland soils on the site, particularly the eastern half where most of the development is proposed to take place. Once this is completed, the boundaries should be superimposed onto the site plan. Flagging the wetlands on the site should greatly aid heavy equipment operators working the site if it is approved for development.

IV. HYDROLOGY

The site lies within the watershed of Assekonk Brook. Two small intermittent streamcourses traverse the site; the larger of the two flows in a southerly direction towards Assekonk Swamp through which the Assekonk Brook flows. The other streamcourse originates in the eastern parts of the site and flows in a westerly direction merging with the larger streamcourse in the southwest corner of the site. From this point, the streamcourse flows into Assekonk Swamp. Assekonk Brook is a tributary to Shunock River.

A water-related concern expressed by town officials on the review day with regard to the proposed development is the potential impact of increased runoff on surrounding properties, particularly Kingswood-Meadow Wood Park. It should be pointed out that portions of the Park are plagued with flooding problems, especially during periods of heavy precipitation. As a result, residents, particularly those on Old Colony Road are concerned that increased runoff from the proposed development will further aggravate existing flooding problems.

Developed portions of the site are drained by the smaller streamcourses, which originates in the wetland area in the eastern part of the property. The overall drainage area of the stream, to the point at which it joins the


ROAD
CROSSING
MAINS
BM 1647
Pitcher Mtn
River
Sand and Gravel Pit
St Thomas Moore Ch
Cem
Assekonk
701
77
BM 147°
North Stonington
Middle Sch
Wheeler Sch
Wheeler High Sch
Brook
JEREMY
HILL
ASSEKONK SWAMP
WILDLIFE MANAGEMENT AREA
HOLLOW
PIPELINE
Cem
Jeremy
184
WATERSHED BOUNDARY
SUBDIVISION SITE
APPROXIMATE WATERSHED*
DESIGN POINT
INTERMITTANT STREAMCOURSE
*Boundary shown does not account for storm sewer system in Kingwood Meadow Wood Park.
NOT TO SCALE

larger stream in the southwest corner of the site, is estimated to be 124 acres. As a result, the proposed development represents about 30 percent of the watershed. Most of the remaining portions of the watershed have been heavily developed, i.e., Kingswood Meadow Wood Park. It should be pointed out that the drainage area boundary mentioned above may not account for possible drainage re-routing through man-made structures, i.e., piping, road drainage system, etc.

Development would be expected to cause at least some increase of runoff from the site for any given amount of rainfall. These increases will result mainly from the creation of impervious surfaces such as roof tops, paved driveways and roads, etc., over permeable soils, removal of vegetation, etc. However, because of the low intensity of the proposed subdivision (five lots), it may be expected that resultant peak flow increase to the stream will be less than 10 percent. No harmful effects from these increases are anticipated.

Based on the present topography and visual observations made on the review day, surface drainage in the eastern parts of the subdivision, where all of the proposed development is to take place, appears to drain in a south-southwesterly direction to the smaller intermittent stream on the property. As a result, it appears that natural drainage in this area is away from the homes along the northside of Old Colony Road. Provided drainage is not altered throughout this area, the potential for increased runoff generated by proposed development should not aggravate the water problems in the Park. As a matter of policy, the Town should require that the applicant prepare a stormwater management plan for pre and post development runoff from the site and include it with the final subdivision proposal. The flood prone areas affecting homes along Old Colony Road should be considered in the preparation of this plan.

The proposed project calls for the construction of a proposed driveway (right-of-way) to serve lots 11-11.06. The road generally parallels the existing dirt road which provided access to a former charcoal briquette business in the eastern parts of the site. An off shoot of the existing road will be utilized to provide access to lot 11.07.

Based on the inland-wetland boundaries superimposed on the plan, approximately 450 feet of this access drive, which needs substantial upgrading, would require crossing wetlands. Wetland road crossings are feasible, provided they are properly engineered. Provisions should be made for removing unstable material beneath the roadbed, backfilling with a permeable road base fill material, and installing culverts as necessary. When crossing any wetlands, the roads should be at least 1.5 feet and preferably 2 feet above the surface elevations of wetlands. This will allow for better drainage of the roads. It will also decrease the frost heaving potential of the road. Road construction through wetlands should preferably be done during the dry time of the year and should include provisions for effective erosion and sediment control. Because the present inland-wetland boundary is so close to the proposed driveway (right-of-way), it is recommended that engineering for the road be done after the site has been flagged by a certified soil scientist. Some discussion was made on the field review day to provide access to Lot 11.07 directly off of Mystic Road (Route 627). It would parallel the stonewall along the eastern side of the adjoining Bradley Property. It should be noted that this route

would also include crossing a large percentage of regulated inland-wetland soils.

Team members were informed on the field review day that the five residences proposed for the subdivision will be served by individual on-site sewage disposal systems and wells. As mentioned earlier in this report, ten deep test pits were excavated on July 20, 1985 throughout the property (two per lot). Test pit data included on the site plan distributed to Team members shows the variability of the till within the site. Textures described in the data in deeper portions of the pits range from "gray clay" to "hardpan." The "gray clay" was encountered in several of th epits at depths ranging between 26 inches and 32 inches. The "hardpan" underlies the "gray clay," and was encountered in several of the pits at depths ranging between 24 inches and 60 inches. Because these soil types (i.e., clay and hardpan) are tight in terms of void space between individual soil particles and because they have been compacted by glacial action, the downward movement of groundwater is commonly restricted. As a result, groundwater levels are commonly elevated or "perched" above the firm layers during wet time of the year. However, according to deep test pit information, groundwater levels were encountered in only two pits at depths of six and seven feet below ground surface. Mottling, which is also an indicator of seasonal groundwater levels was encountered in three pits. At a depth of 50 inches in two of the pits, and 41 inches in the other. The term "mottling" refers to contrasting patches of color in the soil, and are commonly either gray, orange or reddish in color. It should be re-emphasized that soil testing was conducted during the dry time of the year. Because groundwater levels have usually receded by the summer months, it is strongly advised that all lots be retested during the spring months, which according to the State Public Health Code is between February 1 and May 31. This will enable the Town Sanitarian and project engineer to determine groundwater levels during the wet time of the year. Engineered septic system designs must be considered when the maximum groundwater is less than three feet below ground surface. Since compact layers (i.e., "gray clay" or "hardpan) were encountered between 24 inches and 32 inches, it seems likely that groundwater will probably be at these levels during the wet time of year. As a result of the Public Health Code requirement regarding maximum groundwater levels (less than 3 feet below ground surface), all lots will probably require engineered septic systems.

Individual lot listing will provide the local health department with the necessary information to determine suitability for leaching purposes.

V. WATER SUPPLY

Based on discussion with Town officials during the field review, Kingswood Meadow Wood Park is supplied by public water from the Southeastern Connecticut Regional Water Authority. Unless this water line was made available to the Hescock Property, it seems likely the proposed subdivision would be served

by individual on-site water supply wells. Since there is no stratified drift (sand and gravel) aquifer on-site which, depending upon certain hydrogeologic characteristics of a particular area may produce a high yielding well, it appears wells would have to tap the underlying bedrock aquifer. Wells drilled in bedrock generally supply small but reliable yields of groundwater. However, since the yield of a given well depends upon the number and size of water bearing fractures that it intersects, and since the distribution of fractures in bedrock is irregular, there is no practical way, outside of expensive geophysical testing, of predicting the yield of a well drilled in a specific location. Because fractures in the rock generally occur within the first 100 to 150 feet of the surface, it has been shown that the probability of increasing the yield of a well decreases with depth below this level.

Each well should ideally be located on a relatively high portion of a lot, properly separated from the sewage disposal system or any other potential pollutant (i.e., fuel oil storage tank, etc.) and in a direction opposite the expected direction of groundwater movement.

In the lower Thames and Southeastern Coastal River Basin, 279 wells tapping crystalline bedrock (i.e., gneisses, granitic rocks, etc.) were surveyed for Connecticut Water Resources Bulletin No. 15. Of these, approximately 90 percent yielded at least 3 gallons per minute or more. A well yield of 3 gallons is generally satisfactory for most domestic uses.

The natural quality of groundwater should be satisfactory. There may be sufficient amounts of iron and/or manganese minerals to lower the overall quality. If elevated iron and/or manganese levels are present in the water, it may be necessary to provide suitable treatment filters.

As the proposed overall number of lots would be low this should result in an acceptable density for both on-site wells and sewage disposal systems. Because of the extensive wetlands it should be carefully determined that each lot area has sufficient and suitable area available in order to locate a well, and for providing required separation from sewage disposal systems, wetlands, or other restrictive factors.

If a shallow type of well is to be utilized, it should be determined that the casing wall of such a well is made watertight for a distance of at least 10 feet below ground surface. This is necessary in order to prevent the entrance of surface water or water that has received too little filtration and would result in unacceptable sanitary quality. Also shallow wells constructed near swamps often result in water supplies of poor physical quality.

VI. SEWAGE DISPOSAL

Sewage disposal in the rural community of North Stonington depends on the installation of private on-site subsurface sewage disposal systems. With large lots and suitable soil conditions, it is recognized that conventional septic tank systems are a safe, economical, long-term disposal method.

The parcel under question, based on visual observations, soil mapping information, and soil test results, is not particularly favorable for on-site sewage disposal due to considerable wetlands and soil formations. For the most part, there is evidence of high seasonal groundwater conditions and underlying firm to compact soils which restrict downward seepage. The layer of hard soil, at a relatively shallow depth, will cause a perched water condition during the wet season(s). It is noted that test holes on the property were dug during the summer period and findings most likely do not represent maximum ground water conditions,although mottling was in evidence at a number of locations. (See section VII)

It does seem, however, that the best suited area for most of the lots lies along the eastern side. Soil mapping data indicates better drained Canton and Charlton type soils and should only have slight limitations for sewage disposal.

The main concerns for the parcel in regard to sewage disposal is to be able to utilize the most suitable area on each lot for leaching purposes and to situate the proposed sewage system at the correct elevation above the seasonal high water level. In order to meet minimum Public Health Code requirements the bottom area of the leaching system must be at least 18 inches above the maximum ground water table.

All or most of the individual systems should be engineer designed. Depending upon house, well, and sewage system siting, additional test pits should be made to verify soil types and ground water elevations in proposed leach field areas prior to actual approval. Certain site modifications would probably need to be incorporated, and would need to be evaluated as to the effectiveness for overcoming or improving the limiting factors.

VII. SOILS

This section highlights a number of concerns and recommendations relating to the soils found on the site. A soils limitations chart and soil descriptions for the major soil types is included (see Appendix), along with information dealing with the Erosion and Sediment Control Plan (ESC).

- Soil Scientist should delineate the wetland boundary in the field and this information should be surveyed and located on plans. In addition, a soil scientist may be necessary to insure compliance with Sec. 50202 of zoning regulations.

- An Erosion and Sediment Control Plan should be developed as outlined in "Guidelines for Soil Erosion and Sediment Control." This is essential for the proposed driveway (see Plan Outline and Checklist).

- It should be noted that most of the site has severe limitations for on-site sewage disposal.

- Details of proposals for drainage should be shown as plans indicate lots will be draining across others.

- Deep Test Pit interpretations seems to come to inconsistent conclusions, i.e., Lot 11A states mottling @ 50", gray clay @ 32", and groundwater @ 72". In wettest time of year, groundwater will be found @ 32" or less, and mottles will be found above the gray layer.

- If lots 11.05, 11.06, and 11.07 decide they want their own driveways in the future, there would be vast wetland disturbances which might preclude this possibility. Therefore, arrangements for the proposed driveway should be very carefully reviewed.

EROSION AND SEDIMENT CONTROL PLAN OUTLINE

The items following include those required by the law and other items that should be considered when developing the plan and included in the plan if appropriate.

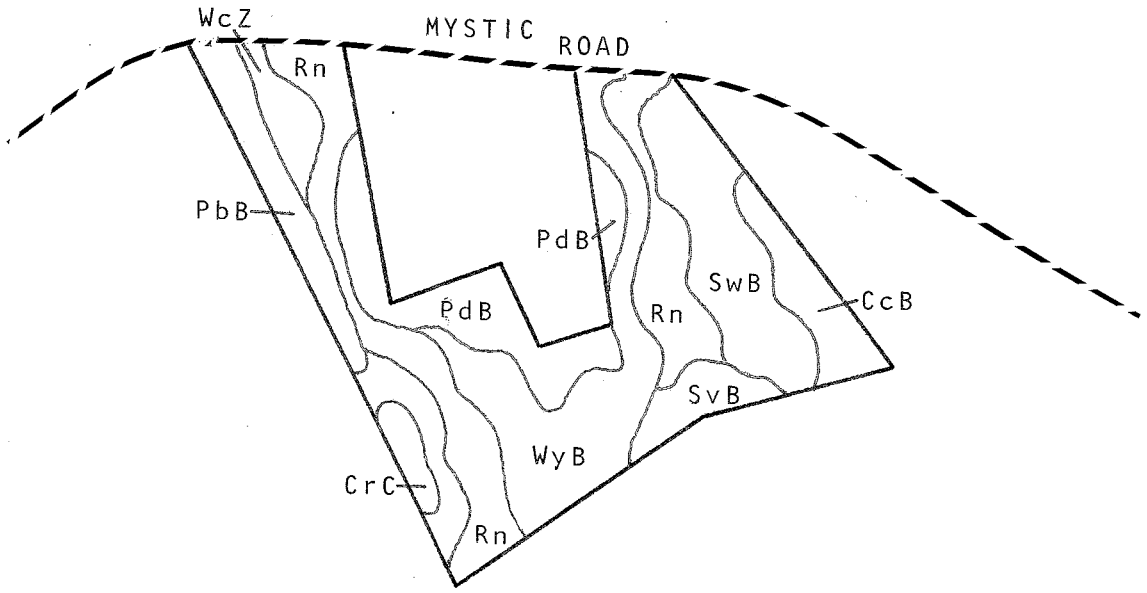
This plan outline should not be used as a basis for plan approval. It is intended to be of assistance in preparing and approving erosion and sediment control plans, and to be a reminder of major items that usually need to be considered when developing a plan.

1. VICINITY MAP

a. Project location
b. Roads, streets
c. North arrow
d. Scale
e. Major drainageways
f. Major land uses of surrounding areas

United States Department of Agriculture
Soil Conservation Service
562 New London Turnpike
Norwich, CT 06360
887-4163

Assisting the New London Soil and Water Conservation District



*Soil boundary lines were derived from a smaller scale map and should not be viewed as precise boundaries, but rather as aguide to the distribution of soils on the property.

SCALE 1" = 660'

2. PROJECT FEATURES

a. Property lines
b. Limit and acreage of development application
c. Limit and acreage of disturbed area
d. North arrow
e. Scale
f. Legend
g. Planned and existing roads and buildings with their location and elevations
h. Land use of surrounding areas
i. Access roads; temporary and permanent

3. NATURAL FEATURES

a. Soils
b. Rock outcrops
c. Seeps, springs
d. Inland and coastal wetlands
e. Floodplains
f. Streams, lakes, ponds, drainageways, dams
g. Existing vegetation
h. Natural features of adjacent areas

4. TOPOGRAPHIC FEATURES

a. Contours; present and planned (normally 2 foot intervals)
b. Areas of cut or fill
c. Planned grades and slope steepness

5. DRAINAGE SYSTEM

a. Existing and planned drainage pattern
b. Existing and planned drainage area map (include off-site areas that drain through project)
c. Size of drainage areas
d. Size and location of culverts and storm sewers
e. Design calculations and construction details for culverts, storm sewers, etc.
f. Size and locations of existing and planned channels or waterways with design calculations and construction details to control erosion of the channel or waterway
g. Existing peak flows with calculations
h. Planned peak flows with calculations
i. Changes in peak flows
j. Off-site effects of increased peak flows or volumes
k. Measures with design calculations and construction details to control off-site erosion caused by the project
l. Survey and soil information below culverts and storm sewer outlets
m. Measures with design calculations and construction details to control erosion below culverts and storm sewer outlets
n. Measures with design calculations and construction details to control groundwater, i.e. seeps, high water table, etc.

6. UTILITY SYSTEM

a. Location of existing and planned septic systems
b. Location and size of existing and planned sanitary sewers
c. Location of other existing and planned utilities, telephone, electric, gas, etc.

7. CLEARING, GRADING, VEGETATIVE STABILIZATION

a. Areas to be cleared, staging and sequence of clearing
b. Disposal of cleared material
c. Areas to be graded, staging and sequence of grading
d. Areas and acreage to be vegetatively stabilized
e. Planned vegetation with details of plants, seed, mulch, fertilizer, planting dates, etc.
f. Temporary erosion protection of disturbed areas
g. Temporary erosion protection when time of year or weather prohibit establishment of permanent vegetative cover

8. EROSION CONTROL MEASURES

a. Construction drawings and details for temporary and permanent measures
b. Design calculations
c. Maintenance requirements of measures during construction of project
d. Person responsible for maintenance during construction of project
e. Maintenance requirements of permanent measures when project is complete
f. Organization or person responsible for maintenance of permanent measures when project is complete

9. NARRATIVE

a. Nature, purpose, and description of project
b. Potentially serious erosion or sediment problems
c. The stages of development if more than one stage is planned
d. The sequence of major operations on the land, such as installation of erosion control measures, clearing, grading, temporary stabilization, road base, road paving, building construction, permanent stabilization, removal of temporary erosion control measures
e. The time required for the major operations identified in the sequence
f. The planned dates for the project. These are often subject to change depending on markets, financing and permit approvals, therefore, the sequence of all major operations and time required for major operations is more important in minimizing erosion and sediment problems.

SOIL EROSION AND SEDIMENT CONTROL
PLAN REVIEW CHECKLIST

An Erosion and Sediment Control Plan should explain in a Narrative, and illustrate with a Site Plan Map, measures which will be taken to control erosion and sediment problems on a construction site. A Plan is needed with any application for development where greater than one-half acre (cumulatively) will be disturbed. A single family dwelling not part of a subdivision is exempt.

Development _____

Town Agency _____

Date _____

For review the following information should be submitted:

Narrative (describe)

_____ The proposed development and extent of land disturbance.

_____ Schedule (dates if practical) and sequence of earth moving activities and installation of control measures.

_____ Construction and installation details of proposed erosion and/or storm water management measures.

_____ Design criteria/calculations for above measures, e.g. culverts, sediment retention pond.

_____ Maintenance procedures notes for temporary or permanent measures.

Site Plan Map (show)

_____ Project location (roads, property boundaries, buildings).

_____ Natural features (topography, soil types, wetlands, drainage courses and water bodies, wooded areas, stone walls, etc.).

_____ 100 year floodplain (if applicable).

_____ Project alterations (limits of disturbance, building locations, cuts/fills, stockpile locations, topography of final grading, access drives, new property lines, etc.).

_____ Location of, and design/installation details, of all proposed erosion and sediment control and storm water management measures. (Draw offset enlargements.

_____ Number sequence of installation and/or application of above measures on plan.

____ Temporary erosion protection when time of year or weather prohibit establishment of permanent vegetative cover.

____ Planned vegetation with details of plants, seed, mulch, fertilizer, lime, planting dates, etc.

This Checklist was developed from requirements found in Section 4 of the Model Soil Erosion and Sediment Control Regulations For Land Development, and from Chapter 4, Plan Outline, both in the Connecticut Guidelines of Soil Erosion and Sediment Control. Normally all items listed will be needed before a technical review can be made.

VIII. WETLAND RESOURCES AND CONCERNS

Description of Major Ecosystems

The property is distinctly divided into two habitat types: oak forest and red maple/shrub swamp. Upland areas are found along the east and west boundaries of the property. Imagining the parcel as a "U"-shape, one can then picture an isolated upland pocket near the bottom of the U.

Wetlands on-site are dominated by red maple, sweet pepperbush, and highbush blueberry. Tussock sedge, cinnamon fern, sensitive fern and white ash are also prevalent. Standing water was present throughout wetland areas during the Team's inspection, but a review of the vegetation suggests that the water table is only seasonally high. The presence of cinnamon fern and highbush blueberry in isolated pockets in the southeast corner of the site implies that there may be isolated wetland soils pockets in this area which are not indicated on the applicant's plans. Wetland areas may be more extensive than shown on the attached vegetation map.

Species in the oak complex dominate upland portions of the site. Red maple is co-dominant in the upland areas, and occasional sassafras, white pine, American chestnut, and hickories are found throughout the site. The understory is not well-developed and includes highbush blueberry and mountain laurel.

Bird species heard or observed were Blue Jays (Cyanocitta cristata), American Crow (Corvus brachyrhynchos), Grey Catbird (Dumetella carolinensis), and House Finch (Carpodacus mexicanus). Other signs of wildlife were deer droppings and woodpecker holes.

No rare or endangered species were observed. Two plant species, whorled pogonia and grape fern, were observed in wetland areas and are worthy of consideration. Although neigher is listed in Rare and Endangered Species of Connecticut and Their Habitats, neither is very common in Connecticut.

Connecticut has many wooded swamps. What separates the Hescock subdivision site from other swamp areas is the extent of standing water and the presence of whorled pogonia and grape fern. While it may be acceptable from a conservation perspective to allow some limited and reasonable uses of the wetland areas, any proposed activity should be designed to minimize adverse impacts to the existing wetland system.

Adverse Impacts

Adverse impacts to wetland resources which may result from the proposed subdivision are:

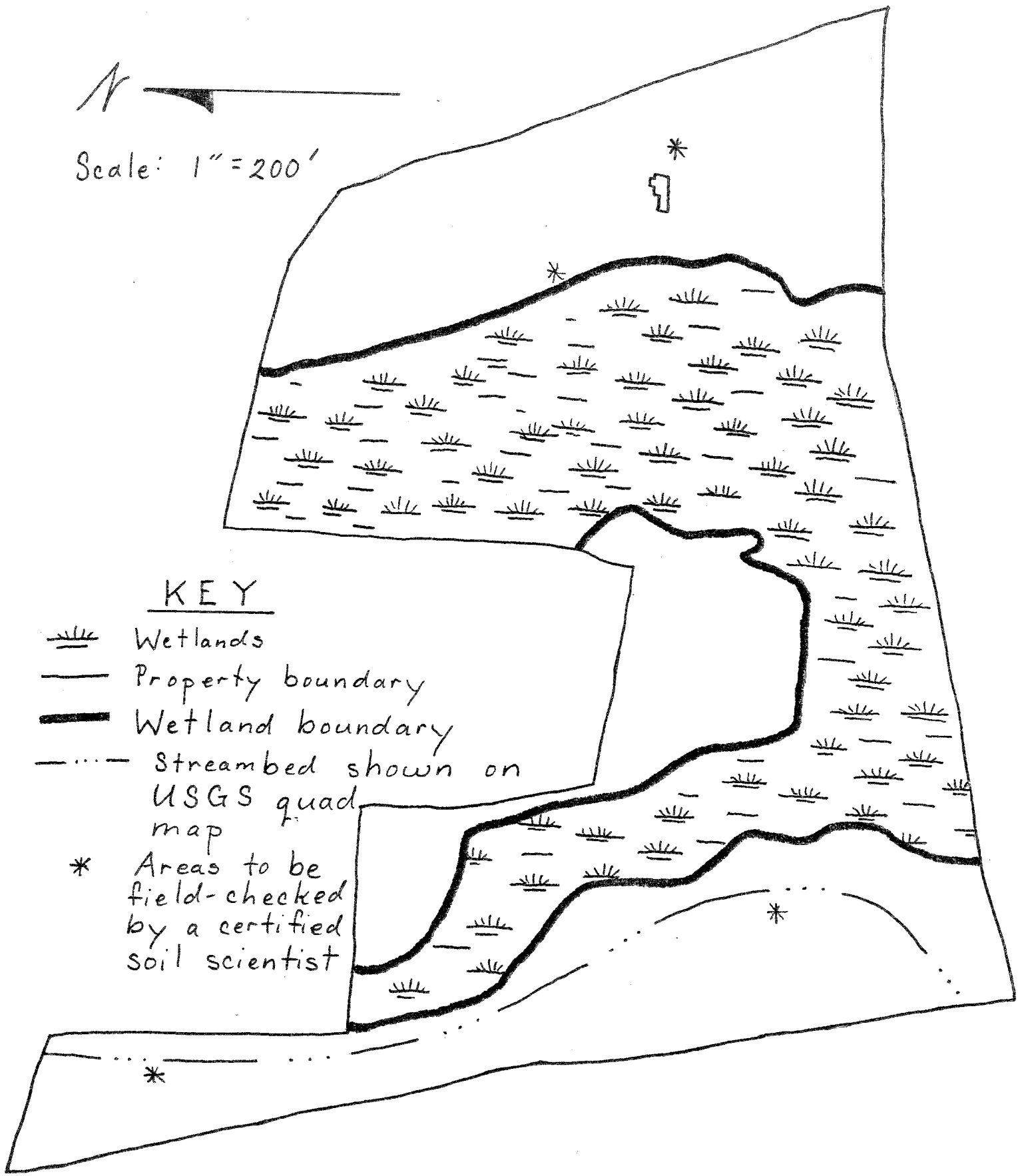
WHORLED POGONIA (Isotria verticillata)

This orchird of moist woodlands has a stem from 8 to 12 inches tall, on which is a whorl of 5 leaves. The solitary flower at the summit has a greenish-yellow lip which is lobed at the tip, and a ridge-like crest in the center. The 3 wide-spreading sepals are greenish tinged with purple. It blooms in May or June.

VIRGINIA GRAPE FERN (Botrychium virginianum)

Leaf 6 to 30 inches high. Sterile part of the blade triangular, somewhat horizontal, yellow-green to rich green, formed by 2 large opposite basal pinnae and 4 or 5 pairs of opposite or sub-opposite smaller pinnae above. It is a succulent fern with soft, juicy tissue above the ground rising from a small, deep, erect stem with spreading, fleshy roots.

VEGETATION MAP
HESCOCK SUBDIVISION



1. Placement of fill for the main access drive and upgrading the wetland crossing could result in siltation and erosion;

2. Use of driveways could result in pollution by oil, grease, and sediment; and

3. Upgrading the roadway could alter the existing hydrological regime. This in turn, would alter vegetation composition. It is likely that the roadway would act as a berm, restricting water flow and causing water to pond on the north side of the roadway. Restricted water flow could lead to water quality problems and the area would become anoxic and anaerobic. This, too, would have a profound effect on the current vegetation composition and on the wildlife which use the site. South of the road, wetland areas might dry out, which would give a competitive advantage to undesirable, aggressive species such as Phragmites. A plant with very low wildlife value, Phragmites could overtake the more ecologically significant wetland sedges and shrubs which currently vegetate the site.

Alternatives and Mitigating Measures

Possible alternatives which would have fewer adverse impacts than the proposed five-lot subdivision are:

1. The "no-build" alternative;

2. Eliminating the proposed improvement of the roadway crossing;

3. Reducing the number of lots; and

4. Locating the entrance drive further from the wetland boundary.

The following measures could be employed to mitigate adverse impacts:

1. Siltation impacts can be prevented by lining proposed toes of slope of roadway embankments with silt fencing or staked haybales. Silt fencing has the advantage of being resuable;

2. Erosion can be avoided by establishing roadway embankments at 1:1 or gentler slopes. Side slopes should be stabilized with riprap, vegetation plantings, or both;

3. Catch basins should be hooded and should be installed above grade to prevent ground and surface water contamination by oil, grease and sediment;

4. The roadway crossing should be designed so that it will not act as a berm. Ample equalizer pipes should be installed below grade to accommodate predicted flows.

5. Filling activities should be done during low-flow periods (dry seasons) to minimize sedimentation impacts; and

6. To minimize wildlife impacts, foundation and landscape planting should employ shrubs and trees with high wildlife value. A combination of deciduous and evergreen varieties should be planted. Deciduous shrubs and trees provide nesting materials and food, while evergreens provide cover during winter months. Plantings might include Japanese yew, Chinese juniper, and red cedar. Berry-producing species are essential and might include hawthorne, dogwood, cherry, highbush blueberry, bayberry and viburnums.

Additional Required Information

Based on the level of information and detail supplied by the applicant, it is difficult to assess the impact and efficacy of the proposed work. Soils mapping presented by the applicant was based solely on Soil Survey of New London County Connecticut, a publication of the U.S. Soil Conservation Service. While this booklet is a useful tool for planning, it lacks sufficient detail on which to base site-specific development decisions. Soils boundaries should be determined and staked in the field by a certified soil scientist. The boundary should also be shown on the applicant's site plans. Vegetation on the applicant's property indicates that wetland areas may be more extensive than indicated on the applicant's plans. It should be demonstrated by an engineer that upgrading the wetlands crossing will not result in ponding effects.

Furthermore, the site plans provided by the applicant are insufficient to show actual wetland encroachment. No details of the proposed improvement of the wetland crossing are provided. It is questionable that the site plan shows the exact extent of the entrance drive. Cross-sections of both the access drive and wetland crossing should be provided. The number, location and size of equalizer pipes for the wetland crossing should be specified. Finally, the applicant should specify the amount of fill to be placed in wetland areas.

IX. PLANNING CONCERNS

The layout of the proposed subdivision meets the dimensional requirements of the Zoning and Subdivision Regulations, but does not appear to meet the spirit or general design intent of those regulations. In a conventional subdivision, lots would be laid out along existing or proposed roads with each lot having direct access to the road. The lots would be generally rectangular, with side boundaries perpendicular or radial to the raod, as prescribed by Section 6.1 of the Subdivision Regulations. Excessively deep or irregularly-shaped lots would be avoided.

The proposed subdivision varies substantially from the conventional layout. With the exception of the smallest lot (#11) in the proposed subdivison (which presumably would have separate access from Route 627), all of the lots resemble

interior building lots in that each intended house location lies to the rear of another house location. However, two factors distinguish them from interior building lots. First, each has the road frontage required for a conventional frontage lot in the R-40 Zone, which is 150 feet. Second, four of the five lots would share a common access driveway, a practice authorized by neither the Zoning Regulations nor the Subdivision Regulations. Indeed, Section 611.5 of the Zoning Regulations clearly prohibits this practice where rear lots are involved. The rule is aimed at avoiding squabbles between neighbors concerning driveway maintenance and use and at limiting the number of persons dependent upon a non-public driveway for access by emergency vehicles. Even new public dead-end streets in North Stonington are limited in length to 600 feet. The proposed private driveway would be about 1,200 feet long.

Another significant problem posed by the access driveway is the location of its intersection with Route 627. It is on the inside of a curve, and large trees and other vegetation grow thick and close along the edge of the roadway. Visibility is limited in both directions. It is essential that adequate visibility be provided in both directions along Route 627 from the point of intersection. Since the Permit Section of District II, Connecticut Department of Transportation, must approve new accesses to state highways, it would be appropriate to seek advice from that Section before determining the precise location and treatment of the intersection.

X. SUMMARY

NOTE: *This a very brief summary of the major concerns and recommendations of the Team. You are strongly urged to read the entire report, and to refer back to the specific sections in order to obtain all the information about a certain topic.*

GEOLOGY - SECTION III

1. *The underlying bedrock may affect water quality, and the water quantity of water withdrawn from any bedrock wells drilled on the site*
2. *There is a high ground water table during part of the year.*
3. *Soil testing was conducted during the dry time of the year and deep test data is probably not representative of sub-surface conditions during the wet time of the year.*
4. *It is recommended that a certified soil scientist map and flag the regulated inland-wetland soils, and this information should be surveyed and located on the plans.*

HYDROLOGY - SECTION IV

1. *Because of the low density of the proposed subdivision (5 lots), it may be expected that resultant peak flow increase to the stream will be less than 10 percent. No harmful effects from these increases are anticipated.*
2. *Provided that the natural drainage is not altered in the eastern parts of the subdivision, the potential for increased runoff generated by proposed development should not aggravate the water problems in Kingswood-Meadow Wood Park.*
3. *The Town should require that the applicant prepare a storm water management plan for pre and post development runoff from the site, and include it with the final subdivision plan.*
4. *It is strongly advised that soil testing (deep test pits) should be retested during the spring months.*

WATER SUPPLY - SECTION V

1. *It appears that the wells will have to tap the underlying bedrock.*
2. *Because of the extensive wetlands it should be carefully determined that each lot area has sufficient and suitable area available in order to locate a well, and providing required separation from sewage disposal systems, wetlands, and other restrictive factors.*

SEWAGE DISPOSAL - SECTION VI

1. *Based on visual observations, soil mapping information, and soil test results the parcel is not particularly favorable for on-site sewage disposal due to the considerable wetlands and soil formations.*
2. *The main concern is to use the most suitable area on each lot for leaching purposes, and to situate the proposed sewage system at the correct elevation above the seasonal high water level.*

3. *All or most of the individual systems should be engineer designed.*
4. *Additional test pits should be made to verify soil types, and and ground water elevations in the proposed leach field areas prior to actual approval.*

SOILS - SECTION VII

1. *An Erosion and Sediment Control Plan should be developed.*
2. *Details of proposals for drainage should be shown on the plan.*
3. *Deep Test Pit interpretations seem to come to inconsistent conclusions.*
4. *Proposed driveway arrangements should be carefully reviewed because of the possiblity of vast wetland disturbances.*

WETLAND RESOURCES AND CONCERNS - SECTION VIII

1. *Proposed activuty should be designed to minimize adverse impacts to the existing wetland system.*
2. *Placement of fill for the main access drive and upgrading the wetland crossing could result in siltation and erosion.*
3. *Use of driveways could result in pollution by oil, grease and sediments.*
4. *Upgrading the roadway could alter the existing hydrological regime.*
5. *Possible alternatives which would have fewer adverse impacts than the proposed 5-lot subdivision are found on page 27.*
6. *Details of the proposed improvement of the wetland crossing should be provided as well as cross-sections of the access drive and wetland crossing.*
7. *The number, location, and size of equalizer pipes for the wetland crossing should be specified, as well as the amount of fill to be placed in the wetland area.*

PLANNING CONCERNS - SECTION IX

1. *The proposed subdivision layout does not appear to meet the general design intent of the Zoning and Subdivision Regulations. The proposed subdivision varies substantially from a conventional subdivision.*
2. *All of the lots resemble interior building lots, but each has the road frontage required for a conventional frontage lot.*
3. *Four of the five lots share a common access driveway which is not authorized by the Zoning Regulations or the Subdivision Regulations. The proposed private driveway would be about 1200 feet long, while new public dead-end streets in North Stonington are limited to a length of 600 feet.*
4. *The location of the access drive is a problem because of its location on the inside of a curve with large trees and heavy vegetation along the roadway. The Connecticut Department of Transportation must approve access to state highways, so their advice should be sought before determining a location and treatment of the intersection.*

Appendix

A. SOILS DESCRIPTIONS

CcB-Canton and Charlton very stony fine sandy loams, 3 to 8 percent slopes

These gently sloping, well drained soils are on glacial till upland hills, plains, and ridges. Stones and boulders cover 1 to 8 percent of the surface. These soils were mapped together because there are no major differences in use and management. Permeability of the Canton soil is moderately rapid in the surface layer and subsoil and rapid in the substratum. The available water capacity is moderate. Runoff is medium. This soil warms up and dries out rapidly in the spring. The soil is strongly acid or medium acid.

Permeability of the Charlton soil is moderate or moderately rapid. The available water capacity is moderate. Runoff is medium. This soil warms up and dries out rapidly in the spring. It is strongly acid or medium acid.

PdB-Paxton and Montauk very stony fine sandy loams, 3 to 8 percent slopes

These gently sloping, well drained soils are on drumloidal, glacial till, upland landforms. Stones and boulders cover 1 to 8 percent of the surface. These soils were mapped together because there are no major differences in use and management. Permeability of the Paxton soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. The available water capacity is moderate. Runoff is medium. Paxton soil warms up and dries out rapidly in the spring. Unless limed, it is strongly acid or medium acid.

Permeability of the Montauk soil is moderate or moderately rapid in the surface layer and subsoil and slow or moderately slow in the substratum. The available water capacity is moderate. Runoff is medium. Montauk soil warms up and dries out rapidly in the spring. Unless limed, it is strongly acid or medium acid.

SwB-Sutton very stony fine sandy loam, 0 to 8 percent slopes

This nearly level to gently sloping, moderately well drained soil is on upland glacial till plains, hills, and ridges. Stones and boulders cover 1 to 8 percent of the surface. The Sutton soil has a seasonal high water table at a depth of about 18 inches. Permeability is moderate or moderately rapid. The available water capacity is moderate. Runoff is slow or medium. Sutton soil warms up and dries out slowly in the spring. It is strongly acid or medium acid in the surface layer and subsoil and strongly acid through slightly acid in the substratum. This soil is not suited to cultivated crops.

Rn-Ridgebury, Leicester, and Whitman extremely stony fine sandy loams

These nearly level, poorly drained and very poorly drained soils are in drainageways and depressions of glacial till upland hills, ridges, plains, and drumloidal landforms. Stones and boulders cover 8 to 25 percent of the surface. These soils were mapped together because there are no major differences in use and management. The Ridgebury soil has a seasonal high water table at a depth of about 6 inches. Permeability is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. The available water capacity is moderate. Runoff is very slow or slow. Ridgebury soil warms up and dries out slowly in the spring. It is strongly acid through slightly acid.

The Leicester soil has a seasonal high water table at a depth of about 6 inches. Permeability is moderate or moderately rapid. The available water capacity is moderate. Runoff is very slow or slow. Leicester soil warms up and dries out slowly in the spring. It is very strongly acid through medium acid.

The Whitman soil has a high water table at or near the surface for most of the year. Permeability is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. The available water capacity is moderate. Runoff is very slow, or the soil is ponded. Whitman soil warms up and dries out very slowly. It is very strongly acid through slightly acid.

WyB-Woodbridge very stony fine sandy loam, 0 to 8 percent slopes

This nearly level to gently sloping, moderately well drained soil is on drumloidal, glacial till, upland landforms. Stones and boulders cover 1 to 8 percent of the surface. The Woodbridge soil has a seasonal high water table at a depth of about 18 inches. Permeability is moderate in the surface layer and subsoil and slow or very slow in the substratum. The available water capacity is moderate. Runoff is medium. This Woodbridge soil warms up and dries out slowly in the spring. It is strongly acid through slightly acid in the substratum.

ERT REPORT - 9/16/85
HESCOCK SUBDIVISION, N. STONINGTON, CT.

Soils descriptions & Limitations

Soil Symbol	Soil Name	BUILDING SITE DEVELOPMENT				SANITARY FACILITIES	
		Dwellings w/o Basements	Dwellings w/ Basements	Local Roads & Streets	Lawns & Landscaping	Septic Tank Absorption Fields	Sewage Lagoon Areas
CcB*	Canton	Slight	Slight	Slight	Moderate: large stones	Slight	Severe: seepage
	Charlton	Slight	Slight	Slight	Severe: slope	Slight	Severe: seepage
PdB*	Paxton	Moderate: Wetness	Moderate: Wetness	Moderate: frost action, wetness	Moderate: large stones	Severe: percs slowly	Severe: slope
	Montauk	Moderate: Wetness	Moderate: Wetness	Moderate: frost action, wetness	Moderate: large stones	Severe: percs slowly	Severe slope
Rn*(1)	Ridgebury	Severe: wetness	Severe: wetness	Severe: wetness, frost action	Severe: wetness	Severe: percs slowly, wetness	Slight
	Leicester	Severe: wetness	Severe: wetness	Severe: wetness, frost action	Severe: wetness	Severe: wetness	Severe: seepage wetness
	Whitman	Severe: ponding	Severe: ponding	Severe: frost action, pond	Severe: ponding	Severe: percs slowly, ponding	Slight
SwB (2)	Sutton	Moderate: wetness	Severe: wetness	Moderate: frost action wetness	Moderate: large stones wetness	Severe: wetness	Severe: wetness, seepage
WyB	Woodbridge	Moderate: wetness	Severe: wetness	Severe: frost action	Moderate: large stones wetness	Severe: percs slowly,	Moderate: slope

(1) = Wetland soils regulated under P.A. 155
(2) = Intermittent streams
* = See description of the map unit for composition and behavior characteristics.

APPENDIX B

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APPENDIX C

VEGETATION INVENTORY

I. Upland Vegetation

New York fern (Dryopteris noveboracensis)
Rock polypody (Polypodium sp.)
Panic grass (Panicum clandestinum)
Kentucky bluegrass (Poa pratensis)
Wood reedgrass (Cinna sp.)
Path sedge (Carex pensylvanica)
Common plantain (Plantago major)
Pink knotweed (Polyganum pensylvanicum)
Indian pipes (Monotropa uniflora)
Striped wintergreen (Chimophila maculata)
Queen Ann's lace (Daucus carota)
White wood aster (Aster divaricatus)
Grey goldenrod (Solidago nemoralis)
Zigzag goldenrod (S. Flexualis)
Highbush blueberry (Vaccinium corymbosum)
Dewberry (Rubus sp.)
Common catbriar (Smilax rotundifolia)
Mountain laurel (seedlings) (Kalmia latifolia)
Tartarian Honeysuckle (Lonicera tartarica)
Poison ivy (Rhus radicans)
Partridge berry (Mitchella repens)
White oak (Quercus alba)
Red oak (Q. rubra)
Sassafras (Sassafras albidum)
Red maple (Acer rubrum)
White pine (Pinus strobus)
American chestnut (Castanea dentata)
Red cedar (Juniperus virginianus)
Wild black cherry (Prunus serotina)
Shagbark hickory (Carya glabra)
Mockernut hickory (C. tomentosa)

II. Wetland Vegetation

Red russula (Russula emetica)
Rose mycena (Mycena pura)
Earthstar (Geastrum sp.)
Yellow witches' butter (Tremella mesenterica)
Ground pine (Lycopodium obscurum)
Cinnamon fern (Osmunda cinnamomea)
Sensitive fern (Onoclea sensibilis)
Virginia grape fern (Botrychium virginianum)
Bracken (Pteridium aquilinum)
Tussock sedge (Carex stricta)
False Solomon's seal (Smilacina racemosa)
Jack-in-the-pulpit (Arisaema atrorubens)
Marsh marigold (Caltha palustris)

Indian pipes (Monotropa uniflora)
Striped wintergreen (Chimaphila maculata)
Prince's pine (C. umbellata)
Whorled pogonia (Isotria verticillata)
Violets (Viola spp.)
Clearweed (Pilea pumila)
Highbush blueberry (Vaccinium corymbosum)
Sweet pepperbush (Clethra alnifolia)
Shadbush (Amelanchier canadensis)
Maple-leaf viburnum (Viburnum acerifolium)
Cinquefoil (Potentilla spp.)
Partridge berry (Mitchella repens)
Black birch (Betula lenta)
Red maple (Acer rubrum)
White ash (Fraxinum americana)
Tulip tree (Liriodendron tulipifera)